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FILE: ▪ Elderberry (*Sambucus nigra*)

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RE: Elderberry Enhances Immune Function by Increasing Inflammatory Cytokine Production

Barak V, Halperin T, Kalickman, I. The effect of Sambucol, a black elderberry-based, natural product, on the production of human cytokines: I. Inflammatory cytokines. *European Cytokine Network* 2001; 12(2):290-296.

Black elderberry (*Sambucus nigra* L.) has traditionally been used by Native Americans to treat rheumatism and fever. The commercial elderberry preparation Sambucol® (Razei Bar Industries, Jerusalem, Israel) has been shown to reduce the duration of flu symptoms and increase antibodies to influenza virus in humans. To further elucidate its mechanism of action, this study examined the effect of Sambucol on inflammatory cytokines, signaling molecules produced by blood cells which participate in the immune response.

Blood cells were obtained from blood donated by twelve healthy volunteers and incubated with standardized elderberry extract and three Sambucol preparations: 1) Sambucol Black Elderberry Syrup (38% standardized black elderberry extract), 2) Sambucol Active Defense (38% standardized black elderberry extract, plus vitamin C, zinc and a proprietary blend of purple coneflower (*Echinacea angustifolia* and *E. purpurea*) and propolis), and 3) Sambucol for Kids (19% standardized black elderberry extract, plus a proprietary blend of purple coneflower and propolis). After a 24-hour culture period, the supernatant was collected and analyzed for cytokines.

All preparations significantly stimulated the production of inflammatory cytokines TNF-á, IL-6, IL-1ß, IL-8. Undiluted elderberry extract was the most potent activator of all four of these cytokines, and was higher than LPS, an accepted cytokine activator, for all but IL-8. The three commercial preparations had a somewhat less pronounced activation, with the least concentrated Kids formula having the lowest effect. However, differences in the three preparations were not statistically significant. The most impressive effect for all preparations was on TNF-á levels. The added echinacea did not contribute to the stimulation of cytokines, in accordance with other studies. The propolis also did not affect cytokine production; this is the first report of such data.

Sambucol has been shown in previous studies to enhance other cytokines (IL-10, IFN-ã and sIL-2R). Because of its strong immunostimulatory properties, the authors suggest that Sambucol may be beneficial in the treatment of flu and in patients with weak immune systems, such as those with cancer and HIV. Future clinical studies in such patients are planned. In addition, Sambucol has been shown to neutralize the West Nile virus in preliminary studies, suggesting it may be useful as a prophylactic agent during relevant seasons.

— Risa N. Schulman, Ph.D.

Enclosure: Original article reprinted from *European Cytokine Network*, Barak V, Halperin T, Kalickman I. The Effect of Sambucol®, a black elderberry-based, natural product, on the production of human cytokines: I. Inflammatory Cytokines, 2001; 12(2): 290-296.